PORT OF DURRES AUTHORITY
ALBANIA

Feasibility Study for the Port of Durres Multi-Modal Container Facility

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VOLUME II

Transport Economics

June 2000

Prepared by

MOFFATT & NICHOL
INTERNATIONAL

In Association with

Michael L. Sclar Associates, Inc.

William B. Kelly & Associates

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1 PORT OF DURRES – TRANSPORT ECONOMICS

1.1 Corridor 8 Transport Costs – Trucking

Owner operators with a single tractor-trailer characterize Albania's motor carrier industry. The Albanian Association of Road Carriers lists 587 members on their roster for 1999-2000 and the overwhelming majority of these operate a single vehicle. The largest operator has nine trucks and two others have six apiece. Ninety five percent of the association members are private entrepreneurs actively engaged in the hard work of trucking in a busy and growing market. This is a very different picture of Albania's motor carriers than what existed only a few years ago. The Ministry of Public Works described the change and its impact on the countries roadway network:

"The existing road network was designed to cater for some 50,000 state owned vehicles, very few passenger cars. Today, the number of cars is estimated to be about 100,000. The road network, including streets in town is generally in bad shape. Many of the rural roads are passable only to four-wheel drive vehicles during the dry season"[1]

The Consultants drove on the roads between Durres, Tirana and the Macedonian Border. Segments between Durres and Tirana were in the worst condition but new construction is underway. The road surfaces east of Tirana are much better but some bridges need repair and the roads are steep and serpentine in the mountains. Truck traffic was light and only a few tractor-trailers were noted en route to the border.

Information regarding operating costs was gathered in personal interviews with truck operators at the ports of Durres, Bari, and Brindisi and at border stations where trucks line the highways waiting to clear Customs[2] and drivers have ample time to be interviewed. Cost information was gathered in the course of interviews and later validated (or not) by the Institute of Transport Studies in Tirana.[3] Table 1.1.1 identifies the major cost elements of motor carrier cost in Albania.

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[1] National Road Plan, Albania. General Roads Directorate Ministry of Public Works and Transport. (Vol-A Final Report, page A-2-6 (13).

[2] Five truckers interviewed at the Albanian/Macedonian border had been delayed for 16 hours prior to the interview.

[3] Thanks to the cooperation of Mr. Jeton Parapani, Director and his able staff.

Table 1.1.1 - General Trucking Costs – Balkan Motor Carriers*

ESTIMATED OPERATING COSTS	USD	LEK
Vehicle Purchase Price	$15,000.00	2,141,250
Vehicle Import Duty	$5,000.00	713,750
Tires (9 per year @ $231ea)	$2,080.00	296,920
Maintenance/yr.	$4,553.00	649,941
Avg. Driver Cost/yr.	$3,678.00	525,035
Avg. Annual Ins.	$152.00	21,698
Int. Operating Permit/1-yr	$84.00	11,991
Vehicle Certificate (20ton)	$14.00	1,999
Domestic Permit-Certificate	$63.00	8,993
Safety Inspections (up to 3/yr)	$9.00	1,285
Foreign vehicle tax@$8/day	$200.00	28,550
Avg. Annual Fuel Cost	$10,000.00	1,427,500
TOTAL	**$40,833.00**	**5,828,911**

* General Trucking Costs Estimated for Balkans Motor Carriers. Based on Albanian Data and Input

Most drivers interviewed were paid on a tonnage carried basis if they were not in fact the owner of the rig. For that reason, the labor costs could be somewhat understated. Several drivers who specialized in building materials, steel and rebar said that they could consistently earn $250 per week hauling between Durres and Tirana.

The following assumptions were taken to calculate costs:

- Average Km Driven Per Year = 50,000
- Fuel cost in USD per liter = $0.50 (71lek)
- Average kilometers per liter of fuel consumed = 2.5
- Speed Limit = 60km/hr for trucks =>12ton.
- Assume 5axle Tractor/Semi trailer.
- Assume 70% loaded km.

Finally, the ownership costs in this analysis are taken in the first year. The majority of tractors/trailers are purchased used and imported from Germany and elsewhere. Many Albanian trucks are six to eight years old when purchased. Maintenance, repair and other operating expenses rise as the unit ages beyond the first year, particularly under the stress of Albanian's current roadway conditions. A careful owner, therefore, could reduce the annual costs, in subsequent years with good maintenance. In the future, operating costs should be reduced, as the roads are rehabilitated and the government should consider reducing the import duty on tractor units, which would encourage the acquisition of newer, more efficient units. Table 1.1.2 summarizes the motor carrier's cost.

Table 1.1.2 - Recap of Motor Carrier Yearly Costs by Major Items (1999-2000)

Equip ownership & maint.	$40,833.00
Diesel fuel	$10,000.00
Single driver	$3,678.00
TOTAL	**$54,511.00**

For the purpose of comparisons with other modes of transport and intermodal combinations, the trucking costs were stated in dollars per kilometer. Table 1.1.3 summarizes the result of that calculation.

Table 1.1.3. - Truck Utilization Estimate and Operating Cost per Kilometer

Utilization	50,000 KM/YR[4]
Operating cost per/km	$1.09 PKM
Cost per/laden km	$1.55 PKM (70% Loaded KMs)

Using the cost per laden kilometer, the motor carrier's cost of moving a 40 foot trailer or container between Durres and Bourgas (954km) is approximately $1,479. Between Durres and Skopje (338 km) the cost would be $ 524. Motor carrier rates from Durres to Skopje are reportedly $715 to $800.[5]

1.2 Corridor 8 Transport Costs – Railroad

Freight transport by rail in Albania is confined to shipments within the country because the Albanian Railway (HSH) is no longer connected to the north south European railway network at Montenegro, though it has been connected in the past. Nor is it connected east west with the Macedonian Railway. The Albanian government, however, has a rehabilitation and development plan that is based on public investment and substantial international support. The railway was examined in February 1999 by rail consultants[6] who concluded in their summary that:

> ***".... HSH is currently operating at a loss and there is no possibility of it producing a profit or a return of investment. They said further that, "...it is not capable of meeting its operational cost from revenue generated neither in freight nor in passenger services."***

[4] National Road Plan, Table 7.4, pp. A-7-4 (9)

[5] See Thompson & Liesenfield Tractor Trailer Study Sept.1999.

[6] Austria Rail Engineering Study, February 1999.

Despite the relevance of some specific HSH cost data, however, the HSH General Director was very helpful in assisting the consulting team in gathering cargo information and generic railway cost data, which proved to be of benefit to the study.

Fortunately, the Bulgarian Railway (BDZ) recently completed an in-depth block train analysis, which focuses on the through movement of intermodal marine containers between the Sofia market and the ports of Thessaloniki (Greece) and Varna (Bulgaria). The study presented detailed revenue and cost data, which is more than adequate for the cost estimates required for Corridor 8 and Durres rail analysis. BDZ is much larger and better equipped than Macedonia or Albania's railways. Its costs, however, are probably higher than necessary due to reduced traffic in recent years and because of hold over labor costs from the previous social system. The BDZ cost, however, is used as a proxy for all of the Corridor 8 railways because it is the best data available.

Table 1.2.1 uses the data in a year 2000 to year 2008 time frame and projects the average cost of rail block train transport in Dollars per FEU kilometer.

Table 1.2.1 - Proforma Rail and Terminal Costs (2000-2008)*

	YR-2000	YR-2005	YR-2008
SOFIA-THESS-SOFIA (2TRAINS=64FEU/WK)	3328		
SOFIA-VARNA-SOFIA (2TRAINS=64FEU/WK)	3328		
SOFIA-THESS-SOFIA (4TRAINS=382FEU/WK)		19889	
SOFIA-VARNA-SOFIA (4TRAINS=382FEU/WK)		19889	
SOFIA-THESS-SOFIA (6TRAINS=694FEU/WK)			36080
SOFIA-VARNA-SOFIA (6TRAINS=694FEU/WK)			36081
TRANSPORT COST/YR	$812,496	$4,536,687	$8,374,321
FEU'S PER YEAR	6656	39778	72161
COST PER FEU	$122	$114	$116
RAIL TERM & DELIVERY COST	$538,986	$3,516,119	$5,832,838
COST PER FEU	$81	$88	$81
TOTAL COST/YEAR	$1,351,482	$8,052,806	$14,207,159
TOTAL COST/FEU	$203	$202	$197
DISTANCE:			
SOFIA-THESS-SOFIA @ 700KM/FEU			
SOFIA-VARNA-SOFIA @ 1064KM/FEU			
AVERAGE KM/FEU =	882	882	882
AVERAGE COST – PER FEU/KM	**$0.230**	**$0.230**	**$0.223**

* Bdz-sls pro forma rail costs and terminal costs
single stack block trains, costs in $per feu

These costs per FEU/KM, when converted to miles, closely approximates the average FEU costs per mile in the United States that existed prior to the advent of double stack container trains. The revenue from piggyback rail services for trailers (TOFC-Trailer on Flat Car) or containers (COFC-Container on Flat Car) helped revive the failing American railway system of

the 1970's and could do the same for Balkan railways [7]today with a sensible international strategy, careful pricing and aggressive service standards and marketing.

1.2.1 Railway Circuity

Modern highways are usually shorter and more direct than railways between the same points, which often gives motor carriers a competitive cost and service edge in the market. Since this analysis is based on the cost of moving FEU's over varying distances by different modes, it is necessary to provide a matrix of key rail and truck distances.

Tables 1.2.2, 1.2.3 and 1.2.4 show the distance by each mode and the differences between them.

Table 1.2.2 - Corridor 8 Rail Distances in Kilometers Between and Via Major Cities

LOCATION	DURRES	ALB-MAC BORDER	STRUGA	SKOPJE	MAC-BUL BORDER	SOFIA	PLOVDI	BUL-TURK BORDER	BURGAS	VARNA
DURRES	0	138	151	320	443	603	740	903	1018	1073
ALB-MAC BDR	138	0	13	182	305	465	602	765	880	935
STRUGA	151	13	0	169	292	452	589	752	867	922
SKOPJE	320	182	169	0	123	283	420	583	698	753
MAC-BUL BDR	443	305	292	123	0	160	297	460	575	630
SOFIA	603	465	452	283	160	0	137	363	446	532
PLOVDI	740	602	589	420	297	137	0	160	237	405
BUL-TURK BDR	903	765	752	583	460	363	160	0	186	316
BURGAS	1018	880	867	698	575	446	237	186	0	174
VARNA	1073	935	922	753	630	532	405	316	174	0

Table 1.2.3 - Corridor 8 Highway Distances in Kilometers Between and Via Major Cities

LOCATION	DURRES	ALB-MAC BORDER	STRUGA	SKOPJE	MAC-BUL BORDER	SOFIA	PLOVDI	BUL-TURK BORDER	BURGAS	VARNA
DURRES	0	150	163	338	453	565	700	866	954	1028
ALB-MAC BDR	150	0	13	188	304	415	550	716	804	878
STRUGA	163	13	0	175	290	402	537	703	791	865
SKOPJE	338	188	175	0	115	231	366	532	616	694
MAC-BUL BDR	453	304	290	115	0	116	251	417	501	579
SOFIA	565	415	402	231	116	0	156	301	385	523
PLOVDI	700	550	537	366	251	156	0	160	250	442
BUL-TURK BDR	866	716	703	532	417	301	160	0	94	228
BURGAS	954	804	791	616	501	385	250	94	0	134
VARNA	1028	878	865	694	579	523	442	228	134	0

[7] Assuming the line is joined soon to make block train operations possible.

Table 1.2.4 Corridor 8 Rail & Highway Distances Compared in Kilometers Between and Via Major Cities (*)

LOCATION	DURRES	ALB-MAC BORDER	STRUGA	SKOPJE	MAC-BUL BORDER	SOFIA	PLOVDI	BUL-TURK BORDER	BURGAS	VARNA
DURRES	0	-12	-12	-18	-10	38	40	37	64	45
ALB-MAC BDR	-12	0	0	-6	1	50	52	49	76	57
STRUGA	-12	0	0	-6	2	50	52	49	76	57
SKOPJE	-18	-6	-6	0	8	52	54	51	82	59
MAC-BUL BDR	-10	1	2	8	0	44	46	43	74	51
SOFIA	38	50	50	52	44	0	-19	62	61	9
PLOVDI	40	52	52	54	46	-19	0	0	-13	-37
BUL-TURK BDR	37	49	49	51	43	62	0	0	92	88
BURGAS	64	76	76	82	74	61	-13	92	0	40
VARNA	45	57	57	59	51	9	-37	88	40	0

* Minus Values in Km = Rail Advantage over Truck; Positive Values in Km = Truck Advantage over Rail

1.2.2 Ocean Carrier Costs per Kilometer: Line Haul – Relays – Feeders and Marine Terminals

Ocean transportation seldom accounts for more than 30% of through intermodal costs. Marine terminals and inland transport are the costly components of combined transport movements. For this reason, intermodal container carriers usually work to maximize the water portion of a through move, in which they are responsible for door-to-door transportation.

The ocean carrier should be seen as the customer in the eyes of terminal operators, railways and motor carriers. The ship owner alone decides the deployment, route and itinerary of the ships. They likewise select inland routes and modes of transport. Choices and decisions of container ship owners drive such trends as "hub-ports", unit trains and inland terminal operations. Careful consideration must be given to their methods and requirements.

Large East-West carriers, whose five and six thousand TEU, line haul vessels, enjoy unprecedented economies of scale, and currently dominate worldwide container transportation. These mega carriers and consortiums increasingly rely on feeder vessels hauling interline cargo to keep their line haul utilization levels at or near full capacity. Line haul vessels transit the Mediterranean calling at container hub-ports en route like Gioia Tauro, Italy or Marsaxlokk, Malta which exist only for the purpose of container relays between the line haul vessels and their cadre of feeder ships.

In recent years, this trend has had the effect of converting traditional "end to end' express carriers into feeder operations. Maersk's recent absorption of the South African carrier

Safmarine, is one example and P&O Ned Lloyd's takeover of Farrell Line[8], is another of this accelerating trend.

Like the Black Sea, all of Africa is becoming a feeder market for container hub ports and the Adriatic ports will follow in the future as the back door of Northern Europe opens to efficient overland container transport. Figure 1-1 is an economic map of the world, which graphically depicts the connection between east-west trade routes and the big national economies like Japan, China, Europe and the United States. Smaller national economies north and south of the Atlantic, Mediterranean and Pacific trade route are becoming feeder markets supplying container traffic to the east-west line haul vessels at hub-ports like Gioia Tauro.

All water transport in the context of this study is identified by its major service "legs." The ocean transport "leg", the marine terminal and the land segments are line items which have individual costs stated in Dollars per FEU and in FEU costs per kilometer. The matrix of costs for each of the routes evaluated is included in Appendix A to this report. Table 1.2.2 recaps the through intermodal costs for each of the routes examined.

[8] In Farrell's case, access to U.S. military cargo and other U.S. government impelled cargo was an additional motive.

Figure 1-1 : GDP World Map with Major Container Ship Routes

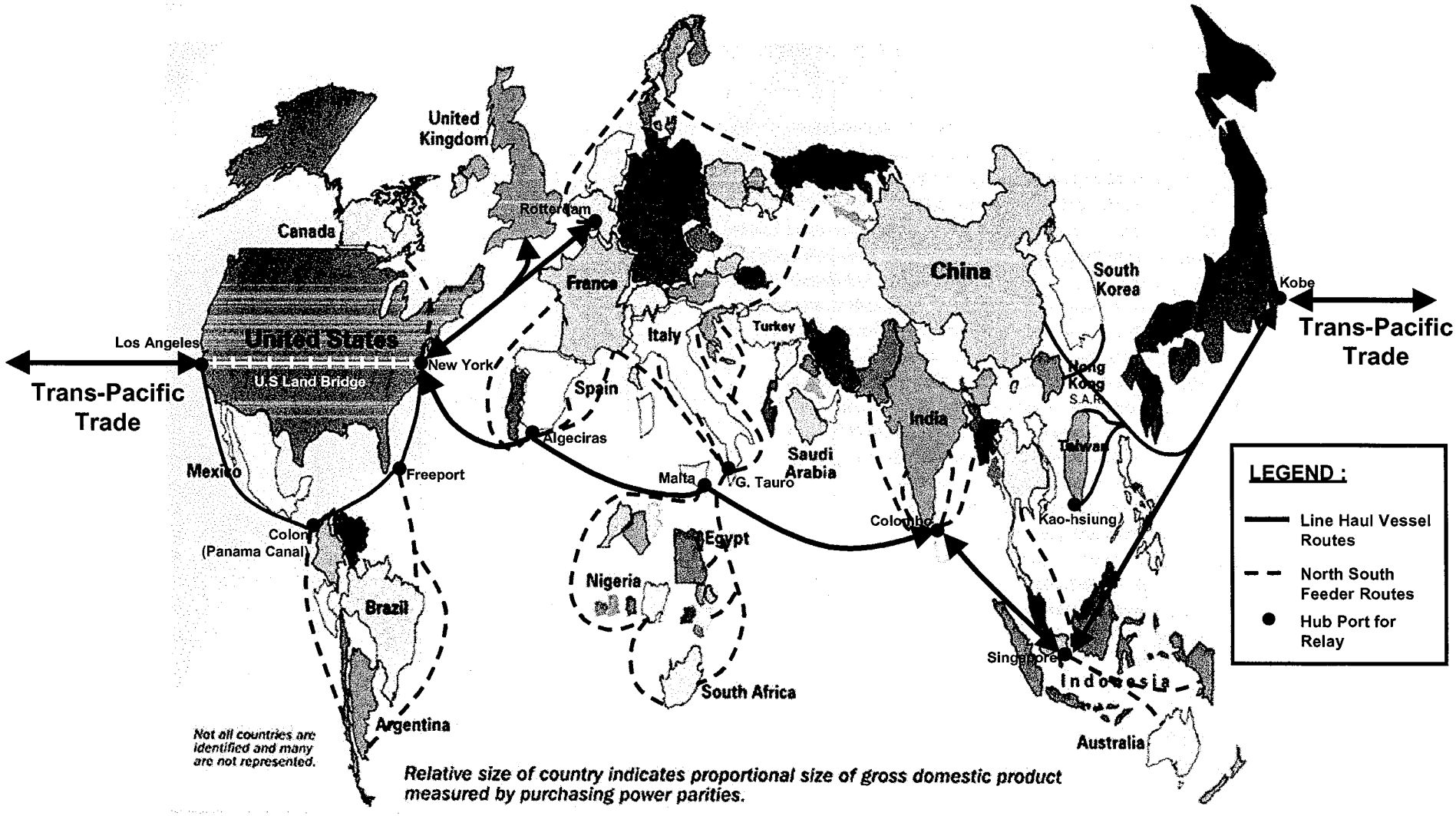


Table 1.2.2 - Feu and Feu/Km Costs Between Selected Port Pairs*

PORT	PORT	SURFACE MODE	DISTANCE IN KMs	FEU COST	COST/FEUKM
NY/NJ	BURGAS	ALL WATER	9,775	$563	$0.058
ROTTERDAM	BURGAS	ALL WATER	6,521	$580	$0.089
MARSEILLE	BURGAS	ALL WATER	2,876	$656	$0.228
TRIESTE	BURGAS	C8 RAIL	2,432	$580	$0.239
NY/NJ	POTI	ALL WATER	10,656	$591	$0.055
ROTTERDAM	POTI	ALL WATER	7,402	$607	$0.082
NY/NJ	POTI	C8 RAIL	10,456	$1,093	$0.105
ROTTERDAM	POTI	C8 TRUCK	7,202	$1,109	$0.154
MARSEILLE	POTI	ALL WATER	3,758	$683	$0.182
NY/NJ	POTI	C8 TRUCK	10,392	$2,337	$0.225
TRIESTE	POTI	ALL WATER	2,527	$614	$0.243
ROTTERDAM	POTI	C8 WATER	7,138	$2,354	$0.330
MARSEILLE	POTI	C8 RAIL	3,558	$1,185	$0.333
TRIESTE	POTI	C8 TRUCK	2,847	$984	$0.346
MARSEILLE	POTI	C8 TRUCK	3,494	$2,430	$0.695
TRIESTE	POTI	C8 TRUCK	2,783	$2,229	$0.801
NY/NJ	SOFIA	C8 TRUCK	8,917	$677	$0.076
ROTTERDAM	SOFIA	C8RAIL	5,663	$694	$0.122
NY/NJ	SOFIA	C8TRUCK	8,879	$1,415	$0.159
ROTTERDAM	SOFIA	C8TRUCK	5,625	$1,431	$0.254
MARSEILLE	SOFIA	C8RAIL	2,019	$770	$0.381
TRIESTE	SOFIA	C8RAIL	1,308	$569	$0.435
MARSEILLE	SOFIA	C8TRUCK	1,981	$1,507	$0.761
TRIESTE	SOFIA	C8TRUCK	1,270	$1,306	$1.028
NY/NJ	VARNA	C8TRUCK	9,387	$786	$0.084
ROTTERDAM	VARNA	C8RAIL	6,133	802	$0.131
NY/NJ	VARNA	C8TRUCK	9,342	$2,132	$0.228
MARSEILLE	VARNA	C8RAIL	2,489	$878	$0.353
ROTTERDAM	VARNA	C8TRUCK	6,088	2,148	$0.353
TRIESTE	VARNA	C8RAIL	1,778	$677	$0.381
MARSEILLE	VARNA	C8TRUCK	2,444	$2,224	$0.910
TRIESTE	VARNA	C8TRUCK	1,733	$2,023	$1.168

* Corridor 8 intermodal carrier costs compared with all water routes between USEC - N.Europe - S. Europe and Italy locations and CIS and Balkan origins and destinations in USD. All water transport included relay costs in Gioia Tauro or Piraeus or other ports. See Appendix A for details.

1.3 Corridor 8 – Suitable Cargoes, Origins and Destination

Albania's well-documented railway and highway infrastructure problems have delayed the development of Corridor 8 as a fully functioning rail or motor carrier route in or through the Balkans. As a consequence, Albania continues to be isolated from the world's containerized

transportation mainstream. The Port of Durres serves as a gateway to Albania alone because it lacks the facilities and infrastructure necessary to exploit its geographic advantages.

Even the U.S. military with its off road equipment capability and self sustained ships pulled out of Durres as soon as the Kosovo build up permitted it to leave. Comments from the Military Transportation Management Command (MTMC) in response to the Consultant's questionnaire, illustrate the point.

> ***"If these (traffic patterns and security) are not improved, more cargo will cause a log jam (and we have seen those there) where nothing moves."***
>
> ***"It is not considered prudent to transfer operations to Durres when there is an established presence, a world-class port and the infrastructure to support inland movement at Thess.***
>
> ***" Weighing the advantages (minimal at best) against the disadvantages it is clearly, not at this time, suitable as a primary SPOD for cargo movements into Kosovo. Additionally, we moved a large portion of our equipment to Kosovo out of Albania and thru Thess.***

Cargo, like water, follows the path of least resistance and that path is currently through Greece and Macedonia for Kosovo traffic – military and commercial. So, for the present, Corridor 8 in Albania is not suitable for rail or highway traffic in containers or trailers east of Tirana. This disability, however, is temporary and will be resolved as improvements in the railway and highway network are completed. In the meantime, there are steps that can be taken to capture transit cargo in trailers and better utilize the existing port and rail facilities.

1.4 Types of Cargo the Port of Durres Should Handle at Present

The Port of Durres should fully exploit the volume potential represented by its growing ferry terminal business. The ferry operators currently calling at Durres focus primarily on short sea tractor-trailer traffic within the Adriatic. These Durres services, however and the traffic volume they haul between Italian ports (Trieste, Ancona, Bari and Brindisi) and Durres, is small compared to the traffic volume between same Italian ports and the Greek ports of Igoumenitsa and Patra. The Consultants estimate for the volume of this traffic is 74,067 FEU's per year. In addition, Macedonia and Bulgaria are served from Thessaloniki and that volume of transit traffic was 9400 FEU's[9] in 1997.

When loaded trailers are discharged in Igoumenitsa they must drive 786 km to make a delivery in Sofia. The same load would save 221 km via Durres and avoid the deviation (125 km one

[9] Sofia Intermodal Terminal Study. Appendix C pp 47.

way) of the longer voyage between Bari and Igoumenitsa. On a round trip basis, the motor carriers operating savings would exceed $700 per trip. This same level of savings is available to Skopje's motor carriers and if captured, the resulting cargo volumes would be substantial for Durres.

During this year, for example, Macedonia will export 8400 FEUS. Some 4300 of these export loads would more naturally move through Durres if the transportation system between Durres and Skopje would permit it.[10] The same is true for Macedonian imports; of the 9000 FEUS available more than 4500 would avoid the expense and circuity of Greek port connections by using Durres. Capturing these exports alone would represent a volume increase for the port of 170% over its 1999 export tonnage via the ferry terminal. In addition it would provide a much needed cargo balance for the ferry and RoRo operators using the port.

The Greek ports view Macedonia, Bulgaria and Serbia as their exclusive hinterland. Durres can serve the same region more directly and with less expense but only if it has the facilities needed to compete effectively for readily available cargo.

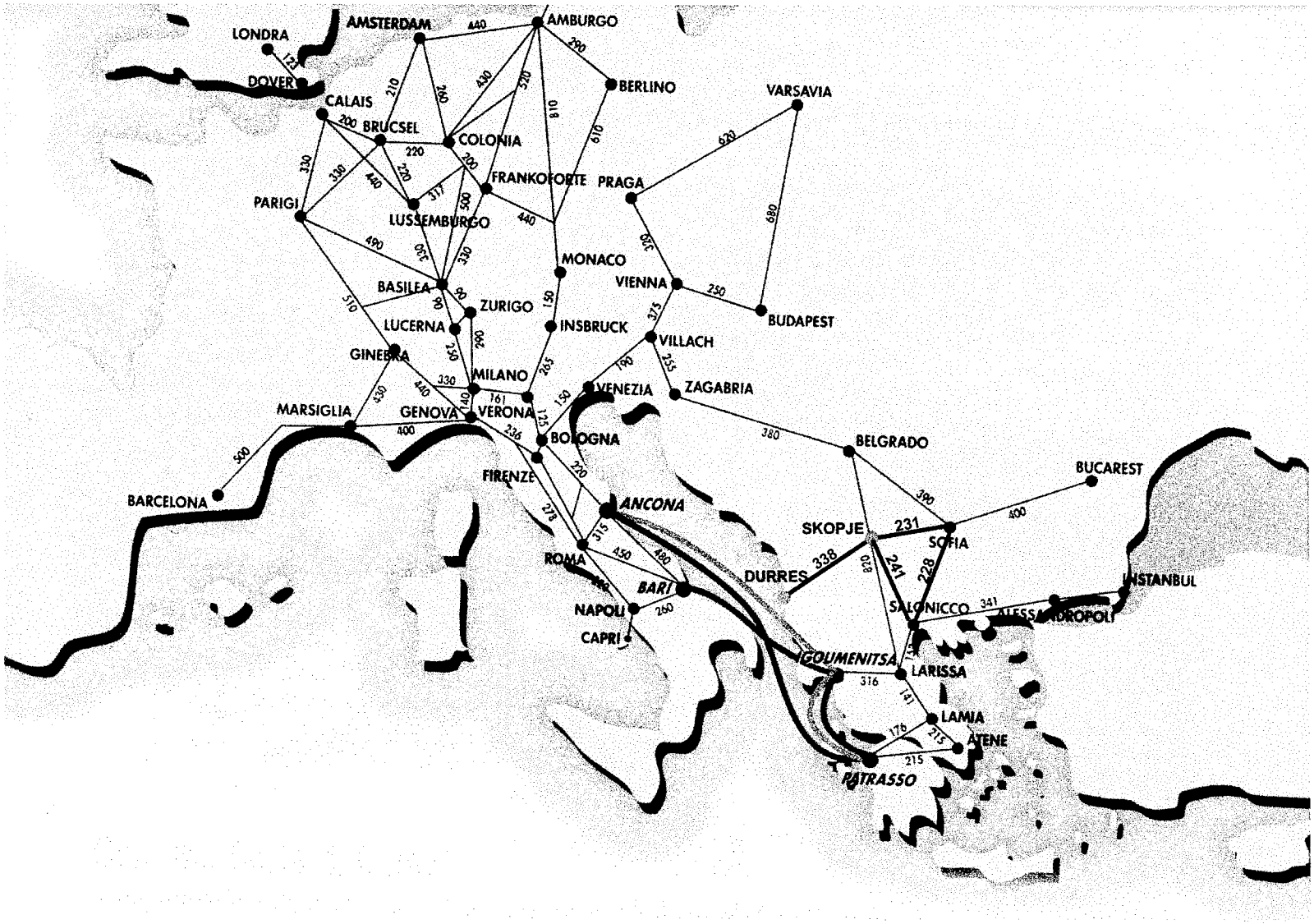
1.5 The Mode of Transport Best Suited for the Port of Durres

Before the question of what mode or what strategy is best for the port can be answered, the competing freight systems that are currently moving the cargo between Northern Europe and the Balkans must be evaluated. Figure 1-2 illustrates the prime freight-gathering network used by European motor carriers in their services between these areas.

Despite Durres's closer proximity to Bari the major cargo flow bypasses Albania in favor of the Greek ports of Igoumenitsa and Patra. The cargo on board those vessels should be the Port of Durres's primary target market. International container traffic currently transiting Thessaloniki and Piraeus are of secondary importance because Durres does not (at this time) have a suitable container facility to work fully cellular feeder ships.

[10] Moffatt & Nichol market forecast, May 2000. Table A-6 for Germany, Italy, France, Spain and Belgium

Figure 1-2 : Europe's Highway & Short Sea Motor Carrier Routes to the Balkans



1.5.1 Long Haul Trucking in Europe is Destined to Change

Europe's system of long distance trucking will not be sustainable in the future because it is too expensive for common markets distribution needs. In addition, deregulatory forces and environmental constraints are forcing the EU to restore to health its anemic railway system.

Last October, Europe's transport ministers agreed in principle that foreign rail operators should have access to the right of way of each of the 15 member states of the EU. The national railroads of Germany and Holland have combined their freight divisions to form "Railion" which has cut costs by 30% since its formation. The company has indicated that it will focus on freight that moves at distances greater than 480 km. It is also proposing to offer a "slot chartering" system on its rail network.[11] In addition, the Swiss and Italian companies have merged in a similar fashion.

In the United States, the container shipping lines drove the railroads into intermodal transport, unit trains and double stack container cars. The federal government rebuilt the bankrupt Northeast carriers (Conrail) strengthening the entire rail network in America. Finally, deregulation laws enacted in 1980 put the American railroads back on the road to profitability.

A similar trend is evident in Europe today as the barriers of political borders are eliminated. In addition, the "Chunnel" between France and England and the five billion Dollar Dutch project to build a new dedicated freight line from Rotterdam to the German border is strong evidence of the European commitment to the long-term revival and health of its rail system.

1.5.2 A Mode of Transport Strategy

The Port of Durres cannot afford to wait for the feeder ship trends and rail intermodal trends to alter the trucking network that bypasses it as a gateway to the Balkan hinterland. Nor can it wait for reconstructed highways and railways at home. The port should market what it has now and adjust in the future as infrastructure improvements permit.

In the United States, the Wabash National Corp. manufactures trailers that can ride directly on the railway pulled by a locomotive. There are some 8000 units (dry vans and reefers) operating in North America. All of America's major railroads are using these special trailers. They are called "RoadRailers." Bayerische Trailerzug who operates daily trains from Cologne via Munich to Verona and Hamburg via Munich to Verona in both directions, is also employing them in Europe. The units will go into operation in France in August. They are also being successfully

[11] Comments by Ed Smulders, member of Railion's executive board. Surface Transportation, Jan, 2000 p130

operated in Australia, Thailand, Canada and China. The company is also "looking at options for European production"[12]

RoadRailers eliminate the need for the railcar. They are easy to load and unload as train units and they do not require any special facilities at the point where the units are put together as trains of trailers. RoadRailers can be attached to the rear of passenger trains. This could be important in Albania because two passenger trains per day run in both directions between Durres and the Macedonian Border. No special equipment or terminal investment would be required at the Macedonian border terminal or in Durres. Figure 1-3 shows a typical "RoadRailer" unit train.

Figure 1-3: RoadRailer Unit Train

In the United States, Intermodal Marketing Companies (IMC) have entered the business of managing pools of RoadRailer equipment. One company "Ice Cold Express" uses 16.2 meter RoadRailer trailers equipped with refrigeration units. They operate one train per week between Chicago and Southern California. The units have microprocessors and a flat antenna on the

[12] According to Dick Snodgrass. VP International Operations (dsnodgrs@wncwabash.com).

trailer's roof so that dispatchers know at all times the exact location of the unit and can adjust the reefer unit's operation en route.

Loaded reefer units often have over weight problems, which can limit their use on the highways but not on the railroads. This and the fact that RoadRailers are profitable at shorter distances make them increasingly popular with perishable shippers and carriers alike. Skopje imported more than 1100 reefer FEU's via Thessaloniki in 1997 and Sofia imported an additional 150 FEU's.[13]

These attributes of the "RoadRailer" system would also have important applications in Albania's trade. Figure 1-4 presents in graphic form the application of the "RoadRider" system for highway and rail transport. Information and specifications regarding "RoadRailer" can be found in Appendix B of this report.

Port managers and railroad officials should evaluate the material provided, observe the European operations in person and begin developing a marketing plan for the development of this unique mode of transport as soon as possible. Promoting the concept and recruiting an investor/operator or Intermodal Marketing Company (IMC) appears to be the indicated first course of action.

1.5.3 Unaccompanied Trailer Units and Albanian Truckers

In the course of this study the Consultants had the opportunity to follow Corridor 8 from beginning to end (Durres to Varna and Bourgas) and to interview truckers at key points along the route. In Bari and Brindisi (Italy) the interviews taken were with truckers hauling loaded trailers to Kosovo, Macedonia and Bulgaria. They originated in Northern Italy, Germany, Switzerland and France. Most of the drivers were Bulgarians or Turks. The drivers were almost unanimous in their preference for the Port of Igoumenitsa in Greece rather than Durres. They expressed negative views regarding Albanian highways, Customs and also expressed a concern for their personal safety in Albania.

Albanian drivers, on the other hand, were perfectly willing to haul loads into Macedonia, Kosovo and Bulgaria. They were not particularly bothered by local highway conditions. The point here is that it would be in Durres best interest to greatly expand the handling of unaccompanied trailers delivered via ferry vessels and then have them driven to and from the hinterland by Albanian drivers. It would also provide more work and jobs for Albanians. The Diamant Transport Group in Durres is already employing this method. The Director of the company in Durres[14] is most conversant in the ways and means of doing business in this way.

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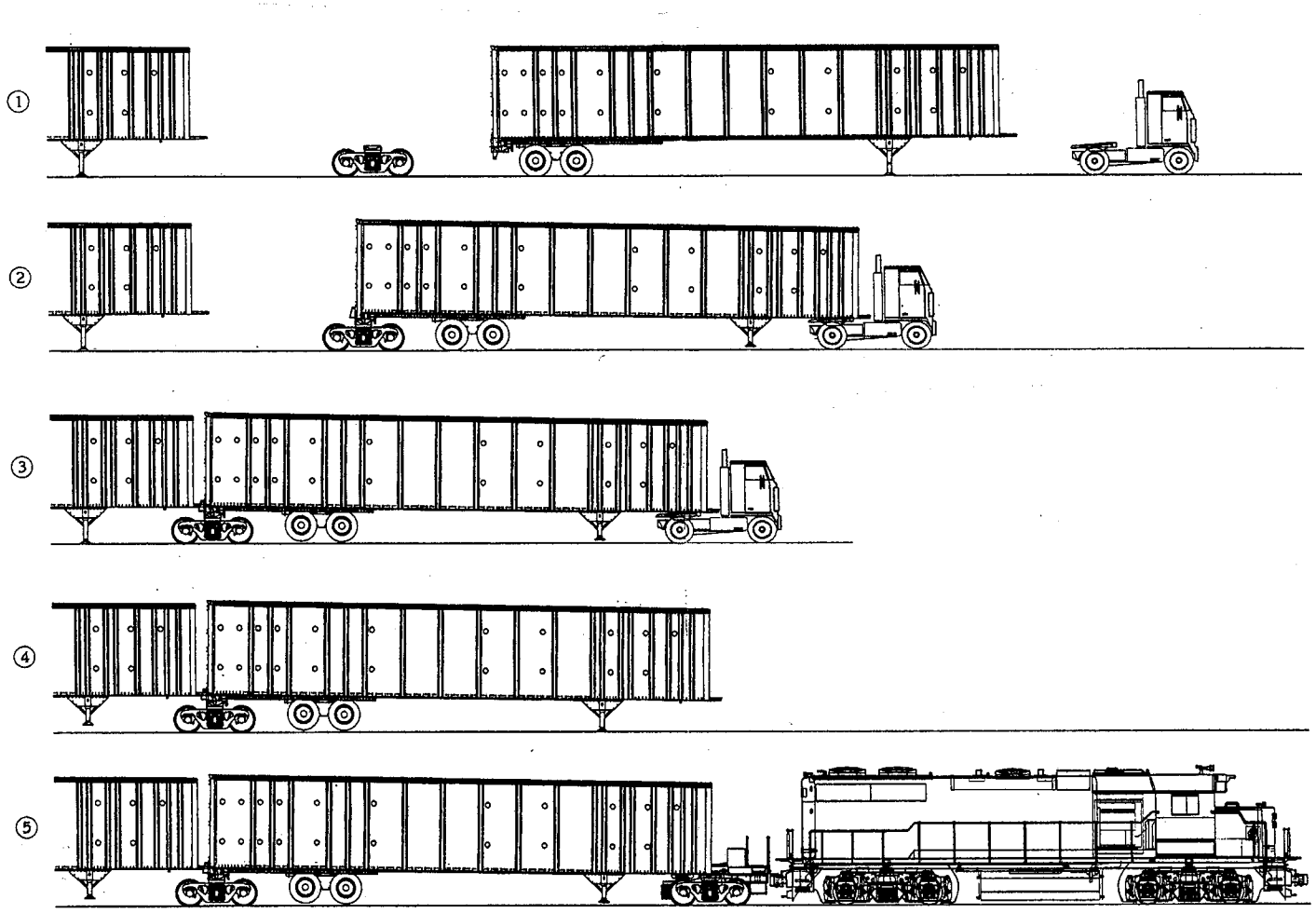
[13] Appendix C. P-44, Sofia Intermodal Terminal Study.

[14] Andi Goga

Figure 1-4 : "RoadRailer" Highway and Railroad Transportation System



1. Hostler tractor positions trailer
2. Trailer air suspension lifts rear of trailer, tractor backs trailer onto rail bogie.
3. Trailer air suspension is vented. Steel coil springs lift tires clear of rail. Tractor backs trailer to coupling with balance of train.
4. Tractor leaves leading trailer on landing gear. Air lines are connected and landing gear is raised on second trailer.
5. CouplerMate is attached to lead trailer. Locomotive connects to CouplerMate. Front trailer landing gear is raised.

His operation focuses on the Trieste-Durres route and his was the only container work noted in Macedonia. Diamant drivers were among the men the Consultant interviewed at the Albanian/Macedonian border. They were hauling relief cargoes into Kosovo from Durres.

Unaccompanied trailers require close coordination and management to offset the shipper's risk and concern of not having some one responsible (the driver) with his merchandise at all times from origin to destination.

The Port should foster this method of transport to the maximum extent permitted and in the short term. In this case also, nothing more than marketing, net working and coordination is required at the outset but it will become necessary for the Port to provide some leadership with the Albanian truckers in developing this Albanian edge for competition with Bulgarian truckers and Greek ports.

1.6 Mode of Transport Best Suited for Corridor 8

In the future, when the railways are connected and the infrastructure is improved, the mode of transport that will prove to be best suited for the corridor will be container on flat car (COFC) movements by unit trains that will shuttle across the Southern Balkan countries without stopping at political borders. The units will move in bond and clear customs at destination terminals electronically. Inland container yards en route at Skopje and Sofia will make up and set out outbound carloads prepared for pickup by the liner train which will only pause to set out imports and pick up exports.

The Port of Durres should have an intermodal container yard operation, in which the unit trains are made up on the terminal. Container cars should be loaded directly from the container ship based on advance manifest information supplied to the port by the ocean carrier. It would be instructive for port operation managers to visit and observe this type of operation in Montreal, Canada. An examination of the Montreal tariffs would likewise be helpful. In Montreal, the container vessels are completely unloaded and then reloaded. This should be the goal at Durres as well. A feeder ship would arrive from Gioia Tauro with an entire consist of Albanian and Corridor 8 traffic. It would be unloaded to waiting rail wagons and be reloaded with containers returning to the hub port.

Containers on flat cars (COFC) moving between Durres and each of the important markets within the Balkan countries will provide Durres with most of its increased volume. The all water competition to Bourgas and beyond defeats the Corridor 8 rail route, which is to be expected, but that is only part of the equation.

The Ports of Bourgas and Varna on the Black Sea, currently receive the bulk of their containers from Bulcon line, an end to end carrier with higher costs and longer less frequent service than the all water service reflected in this report. The costs for all water calculated here are via the

big line haul vessels and a feeder operation like the Maersk-SeaLand service to Varna. Maersk-SeaLand, however, do not serve Bourgas.

All of this is important because time as well as freight charges are money. If an importer has to accept a weeks longer transit, or wait for every other week service via all water, then his cost of owning the goods is factored into his carrier selection. The trans-Balkan rail service envisioned here, would move every day and at faster speeds than feeder ships can bridge the greater distance via the Bosphorus. Exporters often have to wait for "on board bills of lading" to satisfy letters of credit and get paid. With inter-modal rail service, the exporter can get an onboard rail car bill of lading and get paid right away.

For these reasons and the inter-modal experience gained in the U.S. trades, the Consultants are confident that the Corridor 8 rail route will find a ready acceptance in the transportation market. It will also serve to reduce trucking and all water rates in the longer run, which will benefit the local economies.

The Durres inter-modal container facility is required for several other reasons:

- Conventional shipping and breakbulk handling of general cargo is steadily giving way to containers.
- Conventional ships are not being built at replacement levels.
- The new generation of container ships is shifting earlier models into even the smallest trade lanes.
- Durres cannot participate in the future benefits of Europe's shift to the rail inter-modal system without an adequate container terminal to handle the business.
- Durres cannot participate as a feeder port for hub port relays without an adequate container facility.
- Without a container facility in Durres, Albania will lose the benefits associated with low cost transportation and will become dependant on Italy and Greece for transport services.

APPENDIX "A"

MOFFATT & NICHOL
ENGINEERS

Table A-1 : INTERMODAL AND ALL WATER COSTS COMPARED BETWEEN ITALY AND SELECTED BALKAN/CIS LOCATIONS

TRANSPORT SEGMENTS	ORIGIN PORT	RELAY PORT OR INLAND POINT	NMILES	SEGMENT DISTANCES KILOMETER	COST PER KILOMETER	COST PER FEU	TOTAL INTERMODAL COST FEU/KM
OCEAN LEG #1 COST	Trieste	Durres	380	704	$0.561	$395	
BALKAN PORT #1 COST	Trieste	Durres		1	$35.000	$35	
OVERLAND RAIL COST	Trieste	Durres/Bourgas		1,018	$0.230	$234	
BALKAN PORT #2 COST	Trieste	Bourgas		1	$30.000	$30	
OCEAN LEG #2 COST	Trieste	Bourgas/Poti	606	1,122	$0.081	$91	
DESTINATION PORT COST	Trieste	Poti		1	$50.000	$50	
COST PER FEU/KM - Trieste - POTI (RAIL)				2,847		**$835**	**$0.293**
VIA TRUCK:							
OCEAN LEG #1 COST	Trieste	Durres	380	704	$0.561	$395	
BALKAN PORT #1 COST	Trieste	Durres		1	$35.000	$35	
OVERLAND TRUCK COST	Trieste	Durres/Bourgas		954	$1.550	$1,479	
BALKAN PORT #2 COST	Trieste	Bourgas		1	$30.000	$30	
OCEAN LEG #2 COST	Trieste	Bourgas/Poti	606	1,122	$0.081	$91	
DESTINATION PORT COST	Trieste	Poti		1	$50.000	$50	
COST PER FEU/KM - Trieste-POTI (TRUCK)				2,783		**$2,080**	**$0.747**
MICROBRIDGE SOFIA - TRUCK							
OCEAN LEG #1 COST	Trieste	Durres	380	704	$0.561	$395	
BALKAN PORT #1 COST	Trieste	Durres		1	$35.000	$35	
MICROBRIDGE - TRUCK	Trieste	Sofia		565	$1.550	$876	
COST PER FEU/KM - Trieste/SOFIA				**1,270**		**$1,306**	**$1.028**
OCEAN LEG #1 COST	Trieste	Durres	380	704	$0.561	$395	
BALKAN PORT #1 COST	Trieste	Durres		1	$35.000	$35	
MICROBRIDGE - RAIL	Trieste	Sofia		603	$0.230	$139	
COST PER FEU/KM - Trieste- S	Trieste			1,308		$569	**$0.435**

MINIBRIDGE TRUCK	Trieste/Du	Varna	380	1,028	$1.550	$1,593	
COST PER FEU/KM - Trieste- VARNA				1,733		$2,023	**$1.168**
MINIBRIDGE RAIL	Trieste/Du	Varna	380	1,073	$0.230	$247	
COST PER FEU/KM - Trieste-VARNA				1,778		$677	**$0.381**
ALL WATER Trieste - POTI							
OCEAN LEG #1 COST	Trieste	Piraeus	848	1,570	$0.210	$330	
RELAY PORT COST	Trieste	Piraeus		1	$108.000	$108	
FEEDER VESSEL COST	Trieste	Piraeus/Poti	901	955	$0.132	$126	
DESTINATION PORT COST	Trieste	Poti		1	$50.000	$50	
COST PER FEU/KM - Trieste - POTI				2,527		$614	**$0.243**
ALL WATER Trieste - BURGAS							
OCEAN LEG #1 COST	Trieste	Piraeus	848	1,570	$0.210	$330	
RELAY PORT COST	Trieste	Piraeus		1	$108.000	$108	
FEEDER VESSEL COST	Trieste	Piraeus/Burgas	464	859	$0.131	$113	
DESTINATION PORT COST	Trieste	Burgas		1	$30.000	$50	
COST PER FEU/KM - Trieste-BURGAS				2,432		$600	**$0.247**

Table A-2 : INTERMODAL AND ALL WATER COSTS COMPARED BETWEEN NORTHERN EUROPE AND SELECTED BALKAN/CIS LOCATIONS

TRANSPORT SEGMENTS	ORIGIN PORT	RELAY PORT OR INLAND POINT	NMILES	SEGMENT DISTANCES KILOMETER	COST PER KILOMETER	COST PER FEU	TOTAL THRU INTERMODAL COST FEU/KM
OCEAN LEG #1 COST	Rotterdam	Gioia Tauro	2,424	4,489	$0.045	$202.00	
RELAY PORT COST		Gioia Tauro		1	$108.000	$108.00	
FEEDER VESSEL COST		GT to Durres	307	569	$0.369	$209.96	
BALKAN PORT #1 COST		Durres		1	$35.000	$35.00	
OVERLAND RAIL COST		Durres/Bourgas		1,018	$0.230	$234.14	
BALKAN PORT #2 COST		Bourgas		1	$30.000	$30.00	
OCEAN LEG #2 COST		Bourgas/Poti	606	1,122	$0.081	$328.00	
DESTINATION PORT COST		Poti Unld.		1	$50.000	$50.00	
COST PER FEU/KM - ROTTERDAM - POTI (RAIL)				7,202		**$1,197.10**	**$0.166**
VIA TRUCK:							
OCEAN LEG #1 COST	Rotterdam	Gioia Tauro	2,424	4,489	$0.045	$202.00	
RELAY PORT COST		Gioia Tauro		1	$108.000	$108.00	
FEEDER VESSEL COST		GT to Durres	307	569	$0.369	$209.96	
BALKAN PORT #1 COST		Durres		1	$35.000	$35.00	
OVERLAND TRUCK COST		Durres/Bourgas		954	$1.550	$1,478.70	
BALKAN PORT #2 COST		Bourgas		1	$30.000	$30.00	
OCEAN LEG #2 COST		Bourgas/Poti	606	1,122	$0.081	$91.00	
DESTINATION PORT COST		Poti Unld.		1	$50.000	$50.00	
COST PER FEU/KM - ROTTERDAM - POTI (TRUCK)				7,138		**$2,204.66**	**$0.309**
MICROBRIDGE SOFIA - TRUCK							
OCEAN LEG #1 COST	Rotterdam	Gioia Tauro	2,424	4,489	$0.045	$202.00	
RELAY PORT COST		Gioia Tauro		1	$108.000	$108.00	
FEEDER VESSEL COST		GT to Durres	307	569	$0.369	$209.96	
BALKAN PORT #1 COST		Durres		1	$35.000	$35.00	
MICROBRIDGE - TRUCK		Sofia		565	$1.550	$875.75	
COST PER FEU/KM - ROTTERDAM/SOFIA				**5,625**		**$1,430.71**	**$0.254**

OCEAN LEG #1 COST	Rotterdam	Gioia Tauro	2,424	4,489	$0.045	$202.00	
RELAY PORT COST		Gioia Tauro		1	$108.000	$108.00	
FEEDER VESSEL COST		GT to Durres	307	569	$0.369	$209.96	
BALKAN PORT #1 COST		Durres		1	$35.000	$35.00	
MICROBRIDGE - RAIL		Sofia		603	$0.230	$138.69	
COST PER FEU/KM - ROTTERDAM - SOFIA				5,663		$693.65	**$0.122**
MINIBRIDGE TRUCK	Rott/Durres	Varna		1,028	$1.550	$1,593.40	
COST PER FEU/KM - ROTTERDAM - VARNA				6,088		$2,148.36	**$0.353**
MINIBRIDGE RAIL	Rott/Durres	Varna		1,073	$0.230	$246.79	
COST PER FEU/KM - ROTTERDAM - VARNA				6,133		$801.75	**$0.131**
ALL WATER ROTTERDAM- POTI							
OCEAN LEG #1 COST	Rotterdam	Gioia Tauro	2,424	4,489	$0.045	$202.00	
RELAY PORT COST		Gioia Tauro		1	$108.000	$108.00	
FEEDER VESSEL COST		GT to Poti	1,572	2,911	$0.073	$212.00	
DESTINATION PORT COST		Poti		1	$50.000	$50.00	
COST PER FEU/KM - ROTTERDAM - POTI				7,402		$572.00	**$0.077**
ALL WATER ROTTERDAM - BURGAS							
OCEAN LEG #1 COST	Rotterdam	Gioia Tauro	2,424	4,489	$0.045	$202.00	
RELAY PORT COST		Gioia Tauro		1	$108.000	$108.00	
FEEDER VESSEL COST		GT to Burgas	1,096	2,030	$0.118	$240.00	
DESTINATION PORT COST		Burgas		1	$30.000	$50.00	
COST PER FEU/KM - ROTTERDAM - BURGAS				6,521		$600.00	**$0.092**

Table A-3: INTERMODAL AND ALL WATER COSTS COMPARED BETWEEN SOUTHERN EUROPE AND SELECTED BALKAN/CIS LOCATIONS

TRANSPORT SEGMENTS	ORIGIN PORT	RELAY PORT OR INLAND POINT	NMILES	SEGMENT DISTANCES KILOMETER	COST PER KILOMETER	COST PER FEU	TOTAL INTERMODAL COST FEU/KM
OCEAN LEG #1 COST	Marseille	Gioia Tauro	456	845	$0.329	$278	$278.00
RELAY PORT COST		Gioia Tauro		1	$108.000	$108	$108.00
FEEDER VESSEL COST		GT to Durres	307	569	$0.369	$210	$209.96
BALKAN PORT #1 COST		Durres		1	$35.000	$35	
OVERLAND RAIL COST		Durres/Bourgas		1,018	$0.230	$234	$234.14
BALKAN PORT #2 COST		Bourgas		1	$30.000	$30	
OCEAN LEG #2 COST		Bourgas/Poti	606	1,122	$0.081	$91	$91.00
DESTINATION PORT COST		Poti		1	$50.000	$50	
COST PER FEU/KM - Marseille - POTI (RAIL)				**3,558**		**$1,036**	**$0.291**
VIA TRUCK:							
OCEAN LEG #1 COST	Marseille	Gioia Tauro	456	845	$0.329	$278	$278.00
RELAY PORT COST		Gioia Tauro		1	$108.000	$108	$108.00
FEEDER VESSEL COST		GT to Durres	307	569	$0.369	$210	$209.96
BALKAN PORT #1 COST		Durres		1	$35.000	$35	
OVERLAND TRUCK COST		Durres/Bourgas		954	$1.550	$1,479	$1,478.70
BALKAN PORT #2 COST		Bourgas		1	$30.000	$30	
OCEAN LEG #2 COST		Bourgas/Poti	606	1,122	$0.081	$91	$91.00
DESTINATION PORT COST		Poti		1	$50.000	$50	
COST PER FEU/KM - Marseille- POTI (TRUCK)				**3,494**		**$2,281**	**$0.653**
MICROBRIDGE SOFIA - TRUCK							$0.00
OCEAN LEG #1 COST	Marseille	Gioia Tauro	456	845	$0.329	$278	$278.00
RELAY PORT COST		Gioia Tauro		1	$108.000	$108	$108.00
FEEDER VESSEL COST		GT to Durres	307	569	$0.369	$210	$209.96
BALKAN PORT #1 COST		Durres		1	$35.000	$35	
MICROBRIDGE - TRUCK		Sofia		565	$1.550	$876	$875.75
COST PER FEU/KM - Marseille/SOFIA			1,069	**1,981**		**$1,507**	**$0.761**

Table A-3: INTERMODAL AND ALL WATER COSTS COMPARED BETWEEN SOUTHERN EUROPE AND SELECTED BALKAN/CIS LOCATIONS

TRANSPORT SEGMENTS	ORIGIN PORT	RELAY PORT OR INLAND POINT	NMILES	SEGMENT DISTANCES KILOMETER	COST PER KILOMETER	COST PER FEU	TOTAL INTERMODAL COST FEU/KM
OCEAN LEG #1 COST	Marseille	Gioia Tauro	456	845	$0.329	$278	$278.00
RELAY PORT COST		Gioia Tauro		1	$108.000	$108	$108.00
FEEDER VESSEL COST		GT to Durres	307	569	$0.369	$210	$209.96
BALKAN PORT #1 COST		Durres		1	$35.000	$35	
MICROBRIDGE - RAIL		Sofia		603	$0.230	$139	$138.69
COST PER FEU/KM - Marseille- SOFIA				**2,019**		**$770**	**$0.381**
MINIBRIDGE TRUCK		Varna		1,028	$1.550	$1,593	$1,593.40
COST PER FEU/KM - Marseille - VARNA				2,444		$2,224	**$0.910**
MINIBRIDGE RAIL		Varna		1,073	$0.230	$247	$246.79
COST PER FEU/KM - Marseille - VARNA				**2,489**		**$878**	**$0.353**
ALL WATER Marseille- POTI							
OCEAN LEG #1 COST	Marseille	Gioia Tauro	456	845	$0.329	$278	$278.00
RELAY PORT COST		Gioia Tauro		1	$108.000	$108	$108.00
FEEDER VESSEL COST		GT to Poti	1,572	2,911	$0.085	$247	$247.44
DESTINATION PORT COST		Poti		1	$50.000	$50	
COST PER FEU/KM - Marseille- POTI			2,029	**3,758**		**$683**	**$0.182**
ALL WATER Marseille - BURGAS							
OCEAN LEG #1 COST	Marseille	Gioia Tauro	456	845	$0.329	$278	$278.00
RELAY PORT COST		Gioia Tauro		1	$108.000	$108	$108.00
FEEDER VESSEL COST		GT to Burgas	1,096	2,030	$0.085	$173	$172.53
DESTINATION PORT COST		Burgas		1	$30.000	$30	
COST PER FEU/KM - Marseille- BURGAS				**2,876**		**$589**	**$0.205**

Table A-4: INTERMODAL AND ALL WATER COSTS COMPARED BETWEEN USEC AND SELECTED BALKAN/CIS LOCATIONS							
TRANSPORT SEGMENTS	ORIGIN PORT	RELAY PORT OR INLAND POINT	NMILES	SEGMENT DISTANCES KILOMETER	COST PER KILOMETER	COST PER FEU	TOTAL INTERMODAL COST FEU/KM
OCEAN LEG #1 COST	NY/NJ	Gioia Tauro		7,743	$0.024	$185.83	
RELAY PORT COST		Gioia Tauro		1	$108.000	$108.00	
FEEDER VESSEL COST		GT to Durres	307	569	$0.369	$209.96	
BALKAN PORT #1 COST		Durres		1	$35.000	$35.00	
OVERLAND RAIL COST		Durres/Bourgas		1,018	$0.230	$234.14	
BALKAN PORT #2 COST		Bourgas		1	$30.000	$30.00	
OCEAN LEG #2 COST		Bourgas/Poti	606	1,122	$0.081	$91.00	
DESTINATION PORT COST		Poti Unld.		1	$50.000	$50.00	
COST PER FEU/KM - NY/NJ - POTI (RAIL)			5,646	**10,456**		**$943.93**	**$0.090**
VIA TRUCK:							
OCEAN LEG #1 COST	NY/NJ	Gioia Tauro	4,181	7,743	$0.024	$185.83	
RELAY PORT COST		Gioia Tauro		1	$108.000	$108.00	
FEEDER VESSEL COST		GT to Durres	307	569	$0.369	$209.96	
BALKAN PORT #1 COST		Durres		1	$35.000	$35.00	
OVERLAND TRUCK COST		Durres/Bourgas		954	$1.550	$1,478.70	
BALKAN PORT #2 COST		Bourgas		1	$30.000	$30.00	
OCEAN LEG #2 COST		Bourgas/Poti	606	1,122	$0.081	$91.00	
DESTINATION PORT COST		Poti Unld.		1	$50.000	$50.00	
COST PER FEU/KM - NY/NJ - POTI (TRUCK)			5,611	**10,392**		**$2,188.49**	**$0.211**
MICROBRIDGE SOFIA - TRUCK							
OCEAN LEG #1 COST	NY/NJ	Gioia Tauro	4,181	7,743	$0.024	$185.83	
RELAY PORT COST		Gioia Tauro		1	$108.000	$108.00	
FEEDER VESSEL COST		GT to Durres	307	569	$0.369	$209.96	
BALKAN PORT #1 COST		Durres		1	$35.000	$35.00	
MICROBRIDGE - TRUCK		Sofia		565	$1.550	$875.75	
COST PER FEU/KM - NYNJ/SOFIA			4,794	**8,879**		**$1,414.54**	**$0.159**

6/9/00

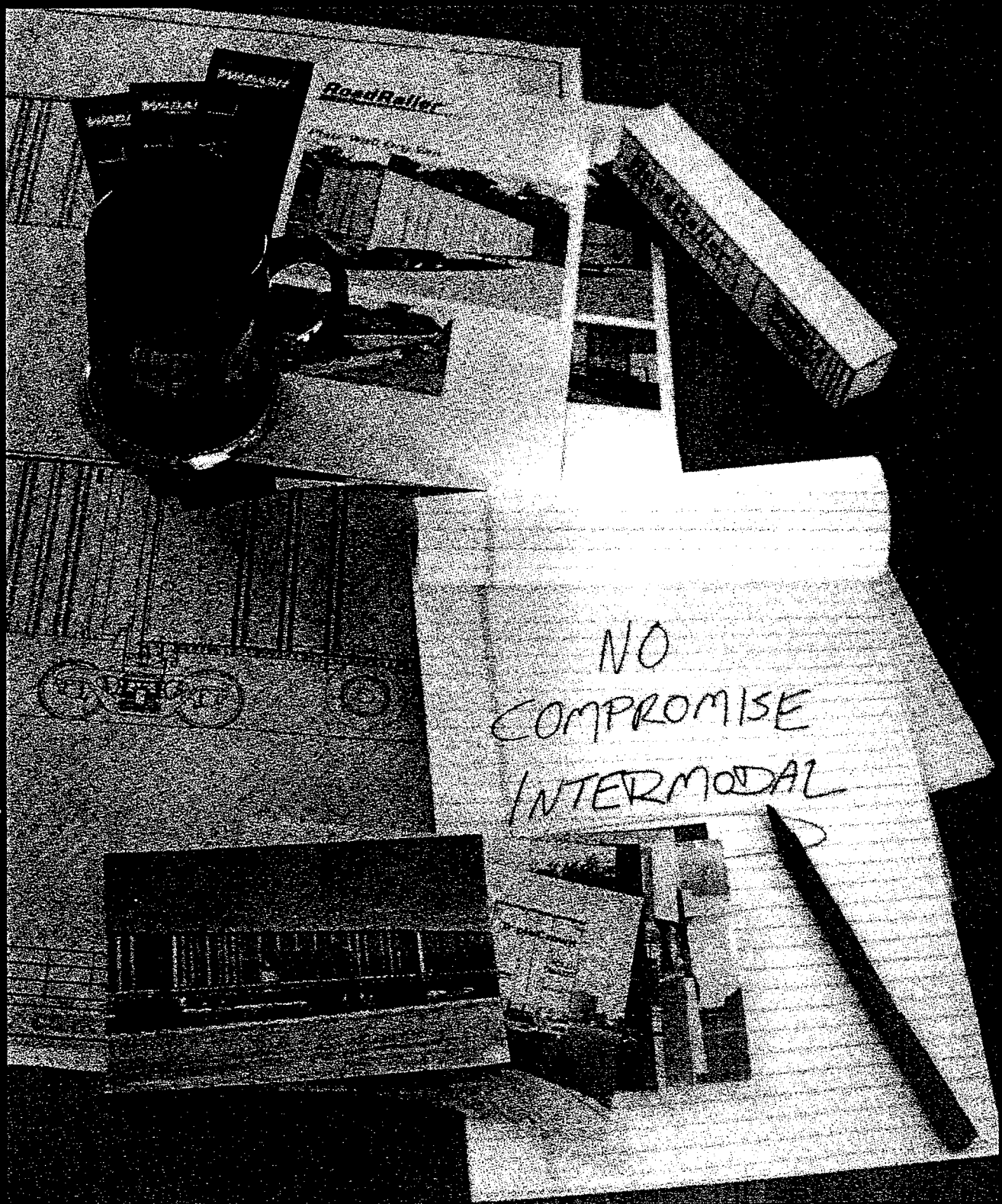
AND SELECTED BALKAN/CIS LOCATIONS							
TRANSPORT SEGMENTS	ORIGIN PORT	RELAY PORT OR INLAND POINT	NMILES	SEGMENT DISTANCES KILOMETER	COST PER KILOMETER	COST PER FEU	TOTAL INTERMODAL COST FEU/KM
OCEAN LEG #1 COST	NY/NJ	Gioia Tauro	4,181	7,743	$0.024	$185.83	
RELAY PORT COST		Gioia Tauro		1	$108.000	$108.00	
FEEDER VESSEL COST		GT to Durres	307	569	$0.369	$209.96	
BALKAN PORT #1 COST		Durres		1	$35.000	$35.00	
MICROBRIDGE - RAIL		Sofia		603	$0.230	$138.69	
COST PER FEU/KM - NY/NJ - SOFIA			4,815	**8,917**		**$677.48**	**$0.076**
MINIBRIDGE TRUCK		Varna		1,028	$1.550	$1,593.40	
COST PER FEU/KM - NY/NJ - VARNA			5,044	9,342		$2,132.19	**$0.228**
MINIBRIDGE RAIL		Varna		1,073	$0.230	$246.79	
COST PER FEU/KM - NY/NJ - VARNA			5,069	9,387		$785.58	**$0.084**
ALL WATER NY/NJ - POTI							
OCEAN LEG #1 COST	NY/NJ	Gioia Tauro	4,181	7,743	$0.024	$185.83	
RELAY PORT COST		Gioia Tauro		1	$108.000	$108.00	
FEEDER VESSEL COST		GT to Poti	1,572	2,911	$0.059	$171.24	
DESTINATION PORT COST		Poti		1	$50.000	$50.00	
COST PER FEU/KM - NY/NJ - POTI			5,754	**10,656**		**$515.07**	**$0.048**
ALL WATER NY/NJ - BURGAS							
OCEAN LEG #1 COST	NY/NJ	Gioia Tauro	4,181	7,743	$0.024	$185.83	
RELAY PORT COST		Gioia Tauro		1	$108.000	$108.00	
FEEDER VESSEL COST		GT to Burgas	1,096	2,030	$0.059	$120.00	
DESTINATION PORT COST		Burgas		1	$30.000	$30.00	
COST PER FEU/KM - NY/NJ - BURGAS				**9,775**		**$443.83**	**$0.045**

APPENDIX "B"

MOFFATT & NICHOL
ENGINEERS

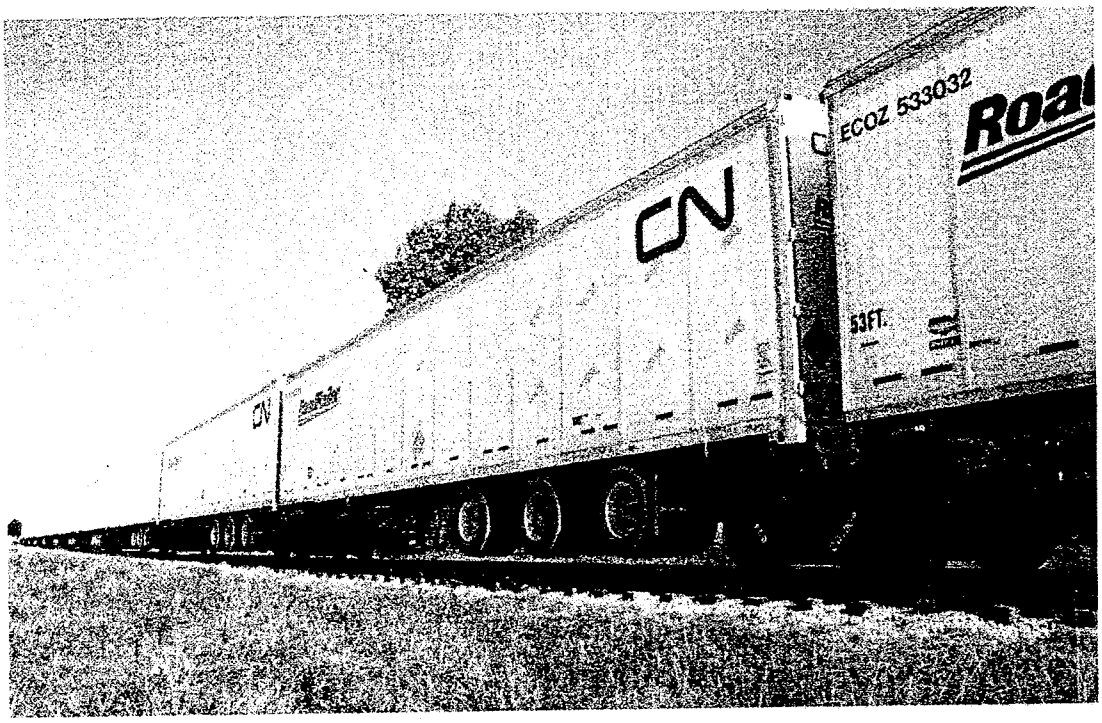
WABASH NATIONAL®

RoadRailer®



THE ROADRAILER™ SYSTEM

Heavy-Haul Tridem DuraPlate™ RoadRailer® Van



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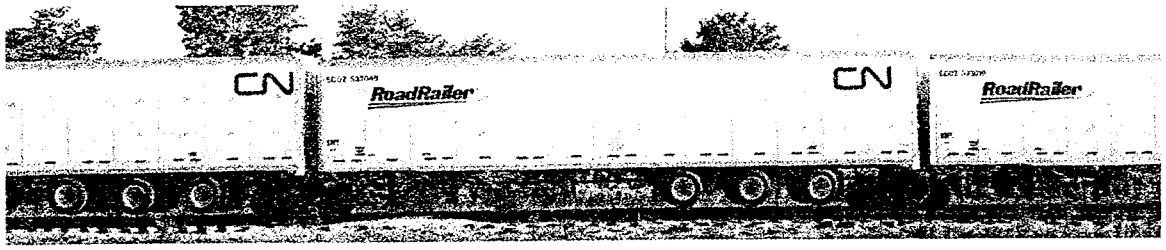
www.wabashnational.com

WABASH NATIONAL®
RoadRailer®



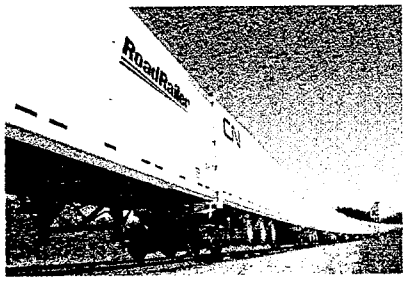
HEAVY-HAUL TRIDEM DURAPLATE ROADRAILER VAN

The 53' Heavy Haul Tridem DuraPlate RoadRailer van is the latest addition to the ever-growing family of Mark V RoadRailer trailers. High strength DuraPlate walls provide maximum interior width while also helping to provide payload capacity in excess of 70,000 pounds. The high lift tridem RoadRailer air ride suspension protects the load from on-road damage and provides the lift to quickly transfer the trailer between highway and rail modes.

RoadRailer DuraPlate van features include:

Maximum Protection
Like all other RoadRailer trailers, the Heavy Haul RoadRailer Van operates in cargo-friendly, slack-free trains. There is no need to block or brace loads as is required on conventional intermodal equipment. In addition, the minimal gaps between trailers in the train (only 12") eliminates break ins and cargo theft.

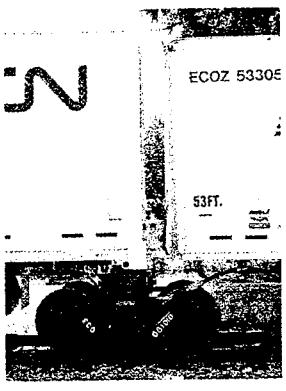
Maximum Interchangeability
The Heavy Haul RoadRailer van is completely interchangeable with other Mark V RoadRailer trailers and rail bogies making it a highly versatile, high capacity intermodal trailer.



Design Load
Rail Buff Forces 400,000 pounds
Rail Draft Forces 400,000 pounds

High Strength Construction
Special design RoadRailer trailers are built to withstand rail tension and compression forces of 200 tons... sufficient for operation of long 125-trailer trains of 4,800 trailing tons.

Air-Ride on Highway
Unique RoadRailer air-ride suspension provides a smooth ride on highway and extra lift for transfer between highway and rail modes.



Slack Free Coupling
The RoadRailer coupler is virtually slack-free, eliminating the "train action" that causes product damage in conventional intermodal service. The typical RoadRailer train has 99.6% less slack than a conventional piggyback train, and 95% less slack than a typical double-stack train.

Maximum Cargo Security
With only 12" between trailers in a RoadRailer train, doors cannot be opened and cargo remains safe and secure.

Rail Brake System
Each trailer is equipped with a 1-1/4" i.d. railroad brake pipe with gladhands for compatibility with conventional rail braking equipment.

Specifications

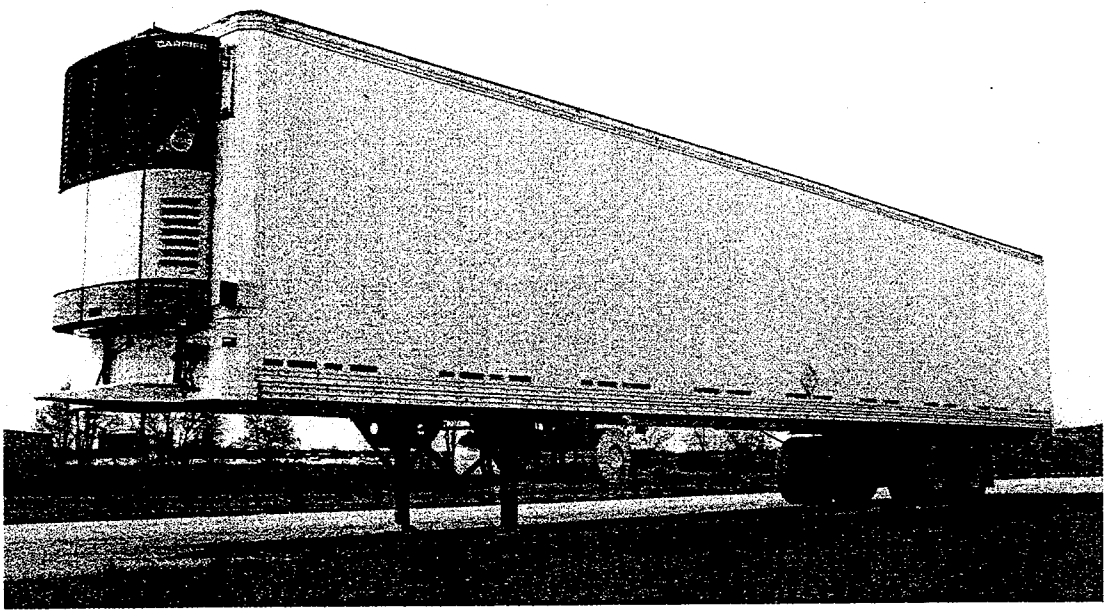
Length	53' 0" outside * 52' 6" inside
Width	102 3/8" outside 101 ¼" inside
Height (highway mode)	13' 6" outside 110" inside front 112 ¼" inside rear
Door Opening	111 3/8" height 98" width
Cubic Capacity	4,066 cu. ft.
Payload Capacity	70,000 pounds

All units conform to AAR Plate B clearance diagram for height.

* Does not include front coupler (for rail operations) which projects 22" forward of front wall of trailer. In calculating trailer length, the coupler is excluded by Federal Regulations.

For more information:
P.O. Box 6129 • Lafayette, IN 47903
sales phone: (765) 771-5475
sales fax: (765) 771-5474

53' ReeferRailer™



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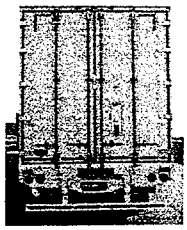
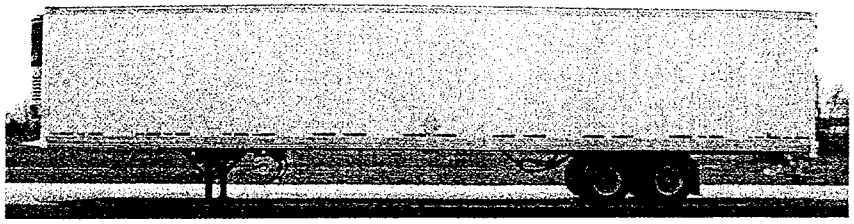
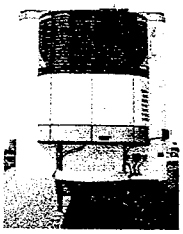
WABASH NATIONAL
RoadRailer







53' ReeferRailer™ Refrigerated Van

Bringing high quality perishable traffic back to the rail, the 53' ReeferRailer trailer is a unique new high performance bi-modal trailer. Featuring the latest in highway trailer designs from Wabash National, the leader in innovative transportation equipment products, the 53' ReeferRailer van is equally at home operating over the highway as a semi-trailer or in a RoadRailer train.

Cubic capacity and thermal efficiency are equivalent to the latest highway reefers while the air ride suspension provides the smoothest possible ride over the road. On rail, the unique RoadRailer rail bogie's high performance suspension, combined with the patented slack free RoadRailer coupler system yields the best ride quality found in any rail system.
The RoadRailer coupling system keeps the trailers close together, eliminating gaps between units, resulting in a significantly more aerodynamic and efficient train. The close coupling also eliminates the potential of cargo theft, an important consideration particularly for high value shipments. The light tare weight of the RoadRailer trailers and rail bogies requires about half the locomotive power and fuel of a conventional piggyback train.

ReeferRailer trailer features include:

Maximum Interior Dimensions - "No compromise" interior dimensions exactly match those of the latest over-the-road trailers and are superior to all refrigerated domestic containers. The nose mounted reefer unit eliminates the need for built-in "picture frame" designs which can reduce cubic capacity. Length and height are unrestricted by rail car lengths or double stack clearance restrictions.

Standard Nose-Mount Reefer Unit - Conventional nose-mount refrigeration units of all manufacturers may be accommodated. There is no need for a costly, specialized nose-mount container unit.

"No Lift" Terminal Operation - The RoadRailer system uses the trailer's suspension to get on and off the rail. Since the trailers are not lifted in terminals, the massive nose shields found on many intermodal reefers and the heavy top and bottom rail protection are no longer needed. With no lifting, there is no chance of causing costly damage to the roof in terminal handling operations.

Damage-Free Operation - The slack free RoadRailer coupler eliminates heavy slack action that causes lading and equipment damage in conventional intermodal trains. The typical RoadRailer train has 99.6% less slack than a conventional piggyback train and 95% less slack than a typical stack train.

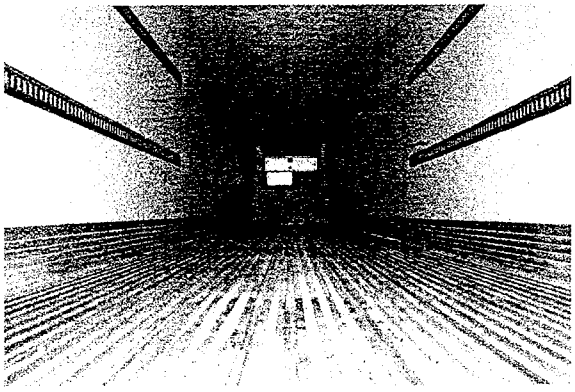
Air-Ride on Highway - The unique RoadRailer highway suspension provides a smooth ride over-the-road and extra lift for transfer between highway and rail modes. Unlike conventional air ride suspensions, RoadRailer's "Parallel Arm" design keeps the trailer safely at the loading dock eliminating trailer "walk" during loading and unloading.

Specifications

Overall Length*	53'
Overall Height	13'6" on 48" fifth wheel
Overall Width	102-3/8"
Inside Length	52' 2"
Inside Height	102-3/4"
Inside Width	97-3/8"
Cubic Capacity	3,627 cu. ft.
Door Opening	97-1/8" w x 102-5/8" h
Kingpin Location	23"
Highway Tandem	Closed, air ride, sliding w/295/75R-22.5 tires
Tandem Locations	Slider
Refrigeration Unit	Standard Nose Mount
Fuel Tank	Belly mounted

All units conform to AAR Plate B clearance diagram for height.

* Does not include front coupler (for rail operations) which projects 33.75" forward of front wall of trailer. In calculating trailer length, the coupler is excluded by Federal Regulations.



For more information:
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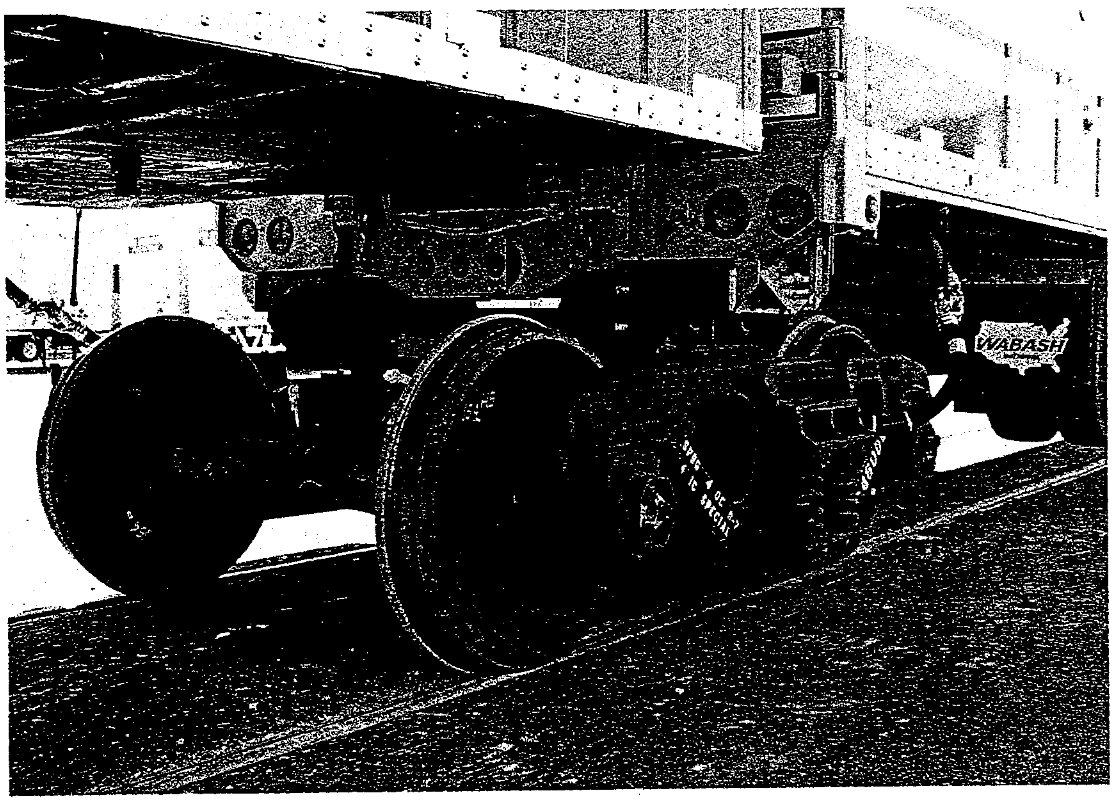
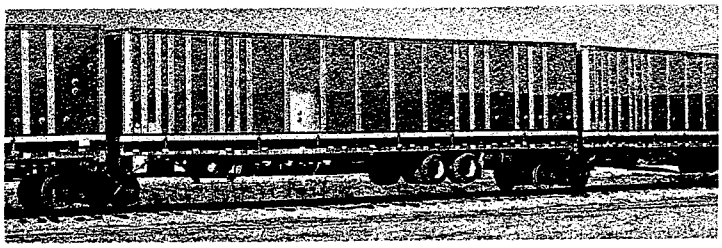
WABASH NATIONAL

BI-MODAL

RoadRailer®

Mark V™ Rail Bogie





Mark V™ Rail Bogie

The Mark V Rail Bogie forms a key part of the innovative RoadRailer system. Attaching this special, high performance rail running gear transforms the RoadRailer trailer from a highway trailer to a high-speed rail vehicle.

The Mark V Rail Bogie is quite simply the most versatile, lowest cost, lightest weight, lowest maintenance intermodal railcar in existence. It functions as a true "universal flatcar" that is is able to handle any size or type of RoadRailer trailer ranging from an ultra-high-cube 57' "rubber-tired-boxcar" trailer, through the 48' ReeferRailer trailer, to the new 28' PupRailer trailer.

Mark V Rail Bogie features include:

High Speed Capability - The Mark V Rail Bogie utilizes the Swing Motion™ truck which is capable of operating smoothly at speeds of 90 mph or more without damaging "truck hunting".

Two-Stage Suspension - A smooth ride is provided by the special two-stage rail bogie suspension. The primary suspension is a special steel spring package designed specifically for RoadRailer service. An additional set of rubber "marshmallow" springs is added to further smooth out the ride.

"Roadbed-Friendly" Technology - With its smooth ride and lightly loaded 70-ton rail truck, Mark V rail bogies impose much less stress and wear on track structures than fully loaded 125-ton trucks on articulated stack cars.

Conventional Rail Brake System - Each Mark V Rail Bogie is equipped with a standard ABDX valve or equivalent, and a 1-1/4" i.d. brake pipe with gladhands for connection to the RoadRailer trailers.

Automatic Spring-Applied Parking Brake - Each bogie is equipped with a spring-applied, air-released parking brake which automatically applies when air pressure is lost. There is no need to set hand brakes to keep RoadRailer trailers from moving.

Bi-Directional Design - The rail bogie need not be turned in the terminal between inbound and outbound trains. Trailers may approach and attach from either direction.

Move with Fork Lift - With a tare weight of 11,600 lb., the Mark V rail bogie may be repositioned in the terminal using a forklift. Bogies may be stored off the working tracks. Railcar storage track requirements are eliminated.

Easy Repositioning of Empties - Up to four rail bogies may be carried in any plate-wall trailer, allowing easy repositioning between terminals when necessary.

Specifications

Maximum Width	8' 0"
Wheel Base	5' 8"
Length (over wheel flanges)	8' 7"
Rail Wheels	AAR J-33, one wear, class C, AAR-1B tread
Roller Bearings	6" x 11" AP type Raised Wheel Seat, Class F
Weight	11,600 lb.

for more information:
Wabash National Corporation
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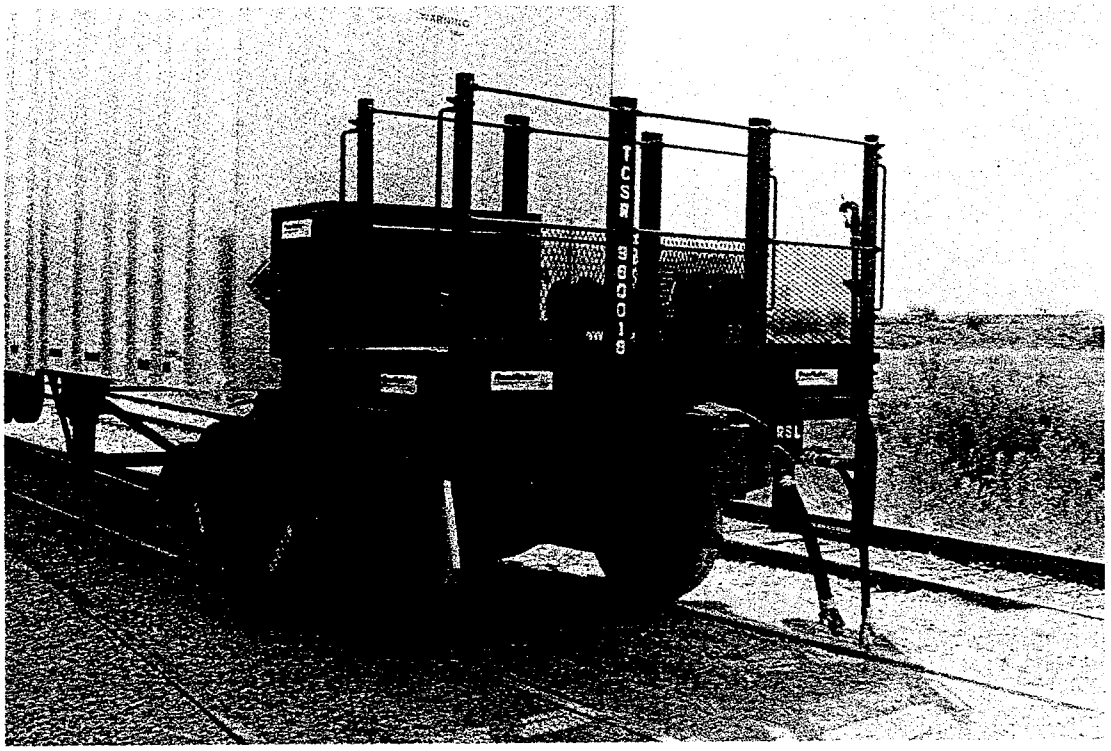
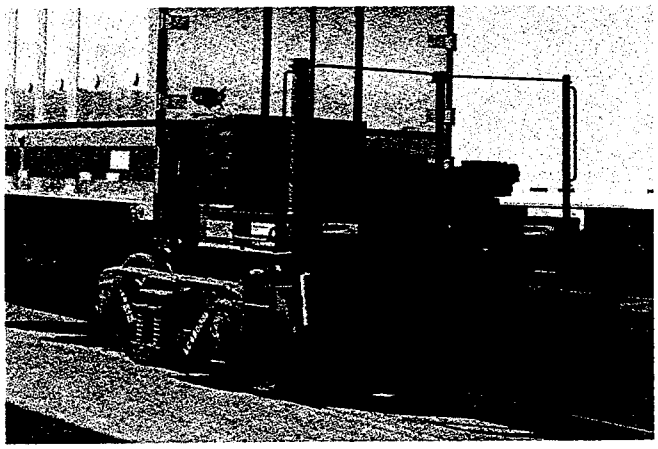
WABASH NATIONAL

RoadRailer®

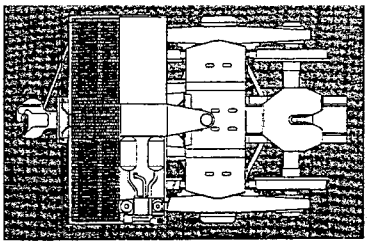
CouplerMate™ Rail Bogie

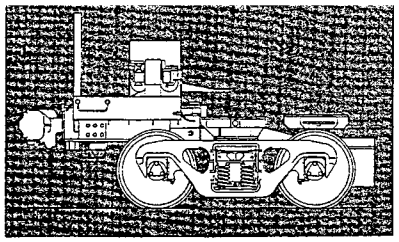


front position



rear position





CouplerMate Rail Bogie

The CouplerMate Rail Bogie provides the means of coupling RoadRailer trailers to locomotives and railcars equipped with conventional railroad knuckle couplers.

The CouplerMate Rail Bogie attaches to the front coupler and kingpin of the lead RoadRailer trailer. The knuckle coupler faces forward to engage the coupler of the locomotive or railcar. No modifications to the RoadRailer trailer are required.

The same CouplerMate bogie, turned to face rearward, may be inserted under the last RoadRailer trailer in the train. In this position, the CouplerMate bogie provides a "handle" for low speed switching and reverse movements of the RoadRailer consist.

CouplerMate Rail Bogie features include:

High Speed Capability - The CouplerMate Rail Bogie utilizes the Swing Motion™ truck which is capable of operating smoothly at speeds of 90 mph or more without damaging "truck hunting".

Safety Appliances - The CouplerMate Rail Bogie is equipped with a full complement of safety appliances including a rider's platform. Also included is a toolbox for carrying spare parts and RoadRailer tools.

Conventional Rail Brake System - Each CouplerMate Rail Bogie is equipped with a standard ABDX valve or equivalent, and a 1-1/4" i.d. brake pipe with gladhands for connection to both the conventional rail equipment as well as RoadRailer trailers.

Automatic Spring-Applied Parking Brake - Each bogie is equipped with a spring-applied, air-released parking brake which automatically applies when air pressure is lost. There is no need to set hand brakes to keep RoadRailer trailers from moving.

Move with Fort Lift - With a tare weight of 18,000 lb., the Mark V CouplerMate bogie may be repositioned in the terminal using a forklift. Bogies may be stored off the working tracks. Railcar storage track requirements are eliminated.

Specifications

Maximum Width	8' 1"
Wheel Base	5' 8"
Length	13' 0"
Rail Wheels	AAR J-33, AAR-1B tread
Roller Bearings	6" x 11" AP type
Axle	Raised wheel seat, class F
Weight	18,000 lb.
Brake Valve	ABDX
Buff/Draft Capability	
Front Position	400,000 lb.
Rear Position	200,000 lb.

for more information:
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WABASH NATIONAL
RoadRailer

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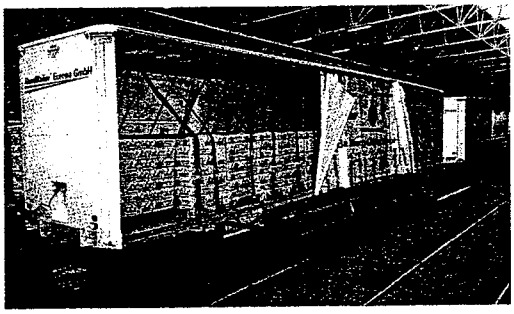
- Italy

Italy



European Curtainside trailer

Australia

India ChassisRailer™ trailer

Adaptable around the world.
The flexible RoadRailer system can be adapted to meet the local conditions of any country. Both rail and highway requirements can be met with ease based on the firm foundation of millions of kilometers of actual operating experience.

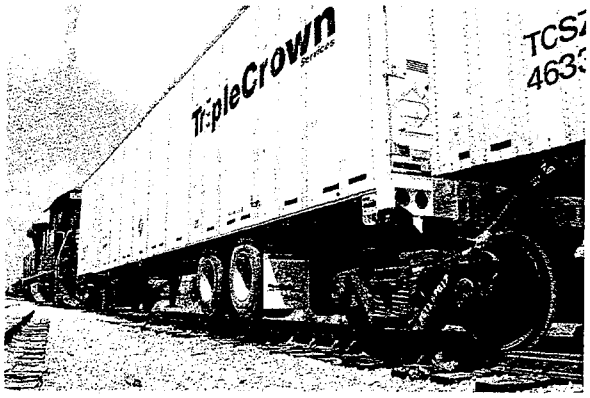
Approved for operation on major European railways.
RoadRailer meets all U.I.C. requirements for bi-modal equipment, and has been approved for operation by British Rail, Deutche Bahn, SNCF and other European railways.

RoadRailer is the low-cost intermodal technology for Europe.
Close-coupling RoadRailer trailers fit the most payload within a given train length. In the same way, the lightweight RoadRailer equipment allows maximum payload to be moved in a train within tonnage limitations of the railways. In addition to line-haul savings, the lower cost of RoadRailer terminal construction and operation versus traditional piggyback or container based terminals is clear.

RoadRailer jumps change-of-gauge barriers easily.
Traditional barriers disappear with the RoadRailer system. RoadRailer bogies may be easily built to different track gauges. On arrival at the border, the RoadRailer trailer simply transfers to highway mode and drives onto the new bogie. Extensive lifting facilities for changing wheelsets, and the attendant delays, are eliminated.

The perfect intermodal system for developing countries.
RoadRailer technology is ideal for nations which are just developing their intermodal system. Why spend great sums on developing terminals and buying special purpose wagons, when the most efficient system does not require it? Leapfrog the present into the future...with RoadRailer!

Superior economics for lowest door-to-door cost.

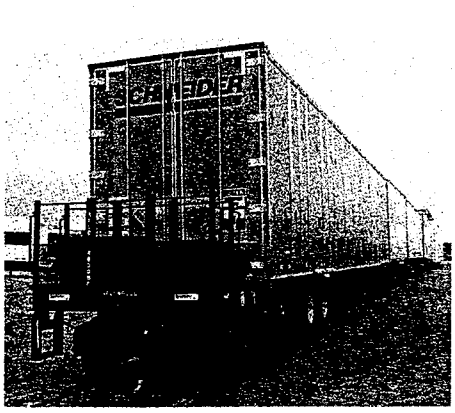


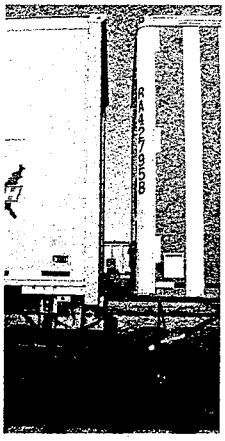
Low Line Haul Cost.

RoadRailer has the lowest tare weight of any intermodal system. Close-coupling RoadRailer trailers also provide unparalleled aerodynamics. Locomotive requirements are minimized. RoadRailer trailers on rail move four times as far per gallon of fuel compared to over-the-road movement.

Low Terminal Cost.

RoadRailer terminals require only a paved track. Expensive lifting devices used by railcar-based intermodal techniques are eliminated as are switching locomotives and railcar storage yards. A tractor and forklift are all that is required. Terminals can be built quickly and easily, where and when they are needed.





Unparalleled Service Quality

The best Ride on Road or Rail.

Air-ride Mark V RoadRailer trailers provide the benefits of air suspension on highway. RoadRailer's unique two-stage rail bogie suspension provides a smooth ride for cargo on rails. When operated in unit trains, RoadRailer's slack-free special trailer-to-trailer coupling system eliminates fore-and-aft shocks from switching and train slack action. Of course, RoadRailer terminal operations eliminate cargo damage from lifting during loading and unloading.

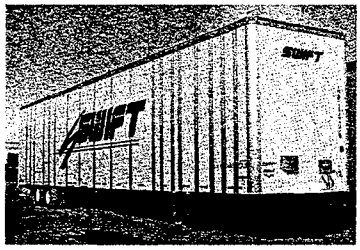
A Secure Trip for Cargo.

With only 12" between trailers, RoadRailer units cannot be entered when in a train. Loss of cargo is greatly reduced.

Flexible Equipment to Meet Customer Needs

What type of Trailer do You Need?

Dry van trailers from 28' to 57' in length. Refrigerated Vans. Container Chassis. Solid Waste Haulers. There's no limit to the size or type of RoadRailer trailer. All trailers fit on the standard RoadRailer rail bogie, and can be coupled together in any order.

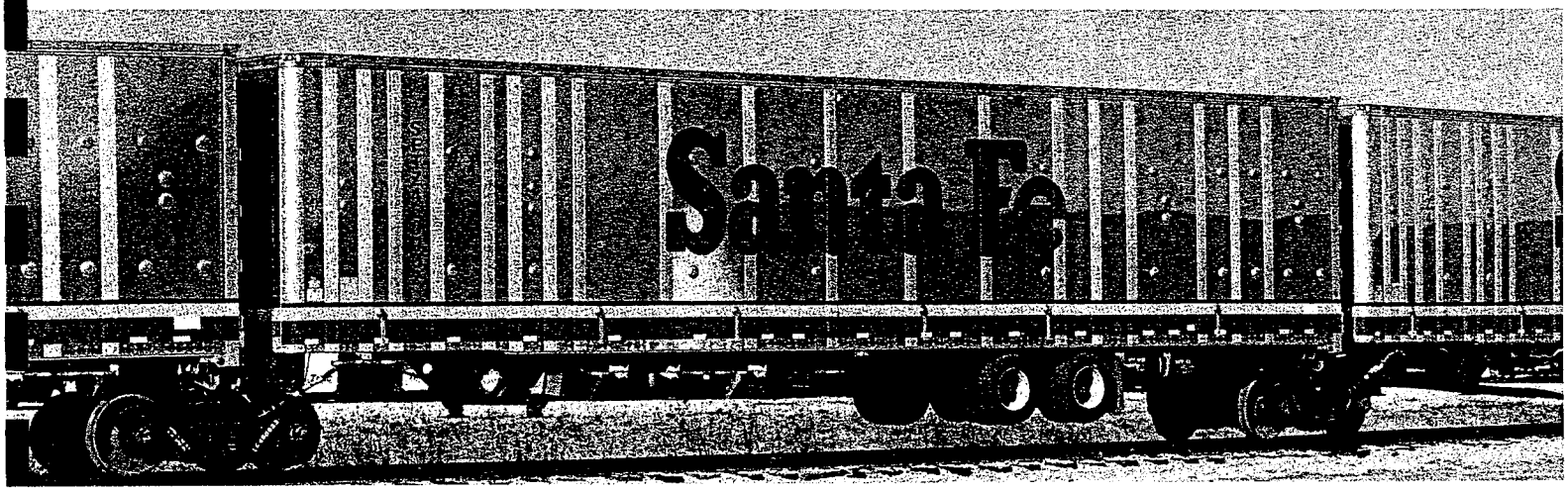


The "No-Compromise" Intermodal Trailer.

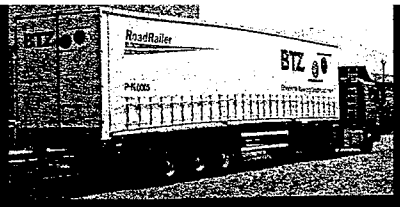
RoadRailer trailers match state-of-the-art highway trailer dimensions in every respect. 53-foot length, 101-1/4" inside width and 111-1/2" unobstructed door opening with 110" unobstructed interior height. No compromises on floor strength. Tare weight differential of less than 800 pounds versus conventional highway dry van trailers.

Flexibility for the Future.

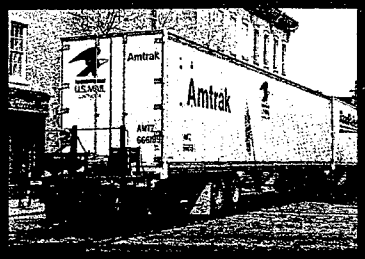
RoadRailer provides intermodal users with the flexibility to meet fast-changing competitive market and regulatory conditions. 57-foot trailers? 120" inside height? Changes to truck weight rules? RoadRailer can handle these changes without breaking stride. For the first time, intermodal service providers will be able to adapt as rapidly as over-the-road service providers.



ReeferRailer™ Van

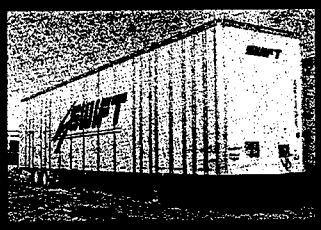


European Curtainside Trailer

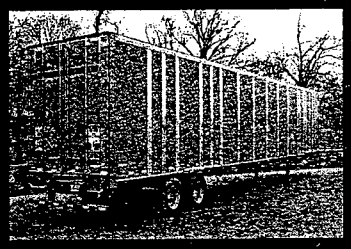


48' Mail Van

WABASH NATIONAL®

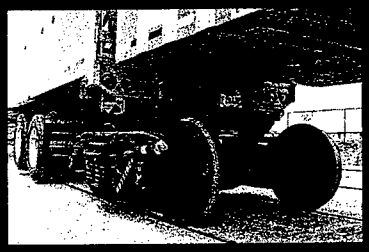


53' Ultra-High-Cube

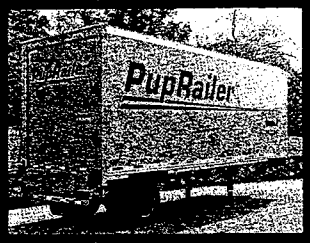


53' Plate Van

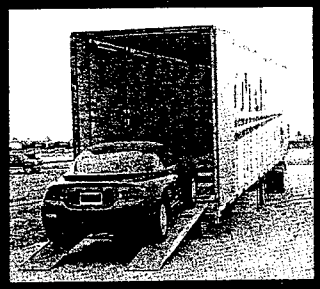
RoadRailer®



Mark V™ Rail Bogie



28' PupRailer™ Van



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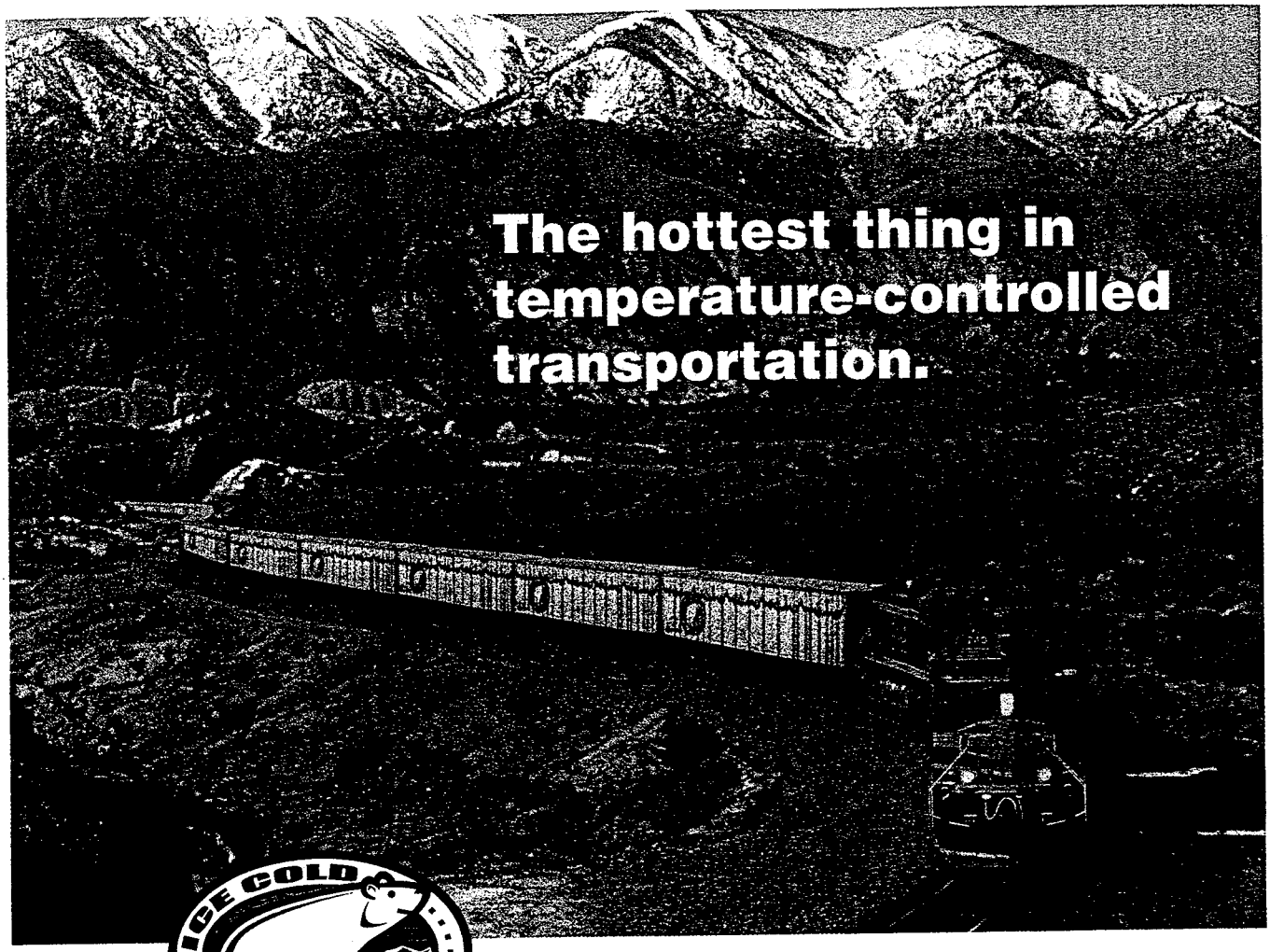

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